

WHAT IS CLAIMED IS:

1. A molecular device having a rectifying  
function to cause asymmetrical progress of transfer of  
an excited state or exciton.

2. The molecular device according to claim 1  
wherein the excited state or exciton is formed by  
light.

3. The molecular device according to claim 1  
wherein the excited state or exciton is injected from  
outside.

4. The molecular device according to claim 1  
comprising at least two molecules or molecule arrays as  
components thereof.

5. The molecular device according to claim 4  
wherein each of said at least two molecules or molecule  
arrays has a straight or linear shape, and can be  
excited directly by light or can make an excited state  
by transfer of excitation energy from adjacent one of  
the molecules or molecule arrays.

6. The molecular device according to claim 5  
wherein the molecule or molecule array is a conjugate

polymer in form of a linear chain, a non-conjugate  
polymer in form of a linear chain, or a linear molecule  
aggregate composed of the same or different kinds of  
molecules.

5

7. The molecular device according to claim 4  
wherein said at least two molecules or molecule arrays  
have cyclic or elliptic shapes, and can be excited  
directly by light or can make an excited state by  
10 transfer of excitation energy from adjacent one of the  
molecules or molecule arrays.

8. The molecular device according to claim 7  
wherein the cyclic or elliptic molecule and molecule  
15 array is a cyclic conjugate polymer, a cyclic non-  
conjugate polymer, or a cyclic molecule aggregate  
composed of the same or different kinds of molecules.

9. The molecular device according to claim 4  
20 wherein one of the molecules or molecule arrays  
physically or chemically couples with at least another  
of the molecules or molecule arrays by conjugated bond,  
non-conjugated covalent bond, charge transfer bond,  
ionic bond, hydrogen bond, stacking by interaction of  $\pi$   
25 electrons, Van der Waals force or an intermediate force  
thereof.

10. The molecular device according to claim  
9 wherein the rectifying function is obtained by using  
irreversible transfer of the excited state or exciton  
between said at least two molecules or molecule arrays  
physically or chemically coupled together.

11. The molecular device according to claim  
10 wherein transfer of the excited state or exciton  
asymmetrically progresses because said at least two  
physically or chemically coupled molecules or molecule  
arrays are not parallel at the joint thereof.

12. The molecular device according to claim  
9 wherein said at least two physically or chemically  
coupled molecules or molecule arrays couple to form a  
joint, and the joint exhibits spatial asymmetry at the  
junction site and thereby causes asymmetrical progress  
of transfer of the excited state or exciton.

13. The molecular device according to claim  
4 further comprising a portion where the molecules or  
molecule arrays are coupled by a resistor device  
inserted therebetween.

14. The molecular device according to claim  
13 wherein the resistor device is a molecule or a  
molecule array and couples with the molecules or

molecule arrays building the molecular device by covalent bonding.

5           15. The molecular device according to claim  
13 wherein the molecule or molecule array used as the resistor device is changed in structure by irradiation of an electromagnetic wave.

10           16. The molecular device according to claim  
13 wherein the molecule or molecule array used as the resistor device is changed in structure by temperature.

15           17. The molecular device according to claim  
1 further comprising at least one input terminal formed in at least one of the molecules or molecule arrays.

20           18. The molecular device according to claim  
17 wherein the input terminal inputs the excited state or exciton by inducing surface plasmon excitation by light.

25           19. The molecular device according to claim  
17 wherein terminal ends of the molecules or molecule arrays are modified by a dye molecule having predetermined molecular orbital energy.

20. A molecule array having a rectifying

function to cause asymmetrical progress of transfer of  
an excited state or exciton.

5           21. A rectifier device having a rectifying  
function to cause asymmetrical progress of transfer of  
an excited state or exciton.

10           22. A rectifying method permitting transfer  
of an excited state or exciton to progress  
asymmetrically.

15           23. A sensor device having a rectifying  
function to cause asymmetrical progress of transfer of  
an excited state or exciton and a function to control  
the rectification property.

20           24. The sensor device according to claim 23  
comprising at least two molecules or molecule arrays as  
components thereof.

25           25. The sensor device according to claim 24  
wherein at least one of said at least two molecules or  
molecule arrays has an ion recognizing function.

26           26. The sensor device according to claim 25  
wherein the rectification property changes depending  
upon the existence or absence of any ions adhering to

the site having the ion recognizing function.

27. A switching device having a rectifying  
function to cause asymmetrical progress of transfer of  
an excited state or exciton and a function to control  
the rectification property.

28. The switching device according to claim  
27 comprising at least two molecules or molecule arrays  
as components thereof.

29. The switching device according to claim  
28 wherein at least one said two molecules or molecule  
arrays has an ion recognizing function.

30. The switching device according to claim  
29 wherein the rectification property changes depending  
upon the existence or absence of any ions adhering to  
the site having the ion recognizing function.

31. A circuit device comprising a switching  
device as a component thereof, said switching device  
having a rectifying function to cause asymmetrical  
progress of transfer of an excited state or exciton and  
a function to control the rectification property.

32. A logical circuit device comprising a

switching device as a component thereof, said switching  
device having a rectifying function to cause  
asymmetrical progress of transfer of an excited state  
or exciton and a function to control the rectification  
property.

33. An operational device comprising a  
switching device as a component thereof, said switching  
device having a rectifying function to cause  
asymmetrical progress of transfer of an excited state  
or exciton and a function to control the rectification  
property.

34. An information processing device  
comprising a switching device as a component thereof,  
said switching device having a rectifying function to  
cause asymmetrical progress of transfer of an excited  
state or exciton and a function to control the  
rectification property.